

**Video description**

**Narration Text**

Narrator.

Still or video of different sized batteries, chargers, etc in stores or other settings.

**Americans buy 3 billion batteries each year and the global market adds billions more in purchases.**

Still or video of batteries being inserted into consumer electronics, electrical power lines and military use of batteries in the field.

**Batteries and energy storage devices are growing in importance to consumers, industries and the military.**

Narrator.

Still or video of electric cars, close up of EV battery systems, plug in chargers and locations on EVs

**Now, the expanding market of electric and hybrid vehicles with battery systems costing \$15,000 or more underscores demands for a**

Could show battery charger operating and green light coming on as the battery reaches a full charge.

**highly accurate state-of-health battery assessment capability to ensure personal safety, reliable performance, reduction of waste, and even resale of used vehicles.**

Narrator.

Battery testing being conducted in a lab with technicians at controls.

**Only expensive laboratory tests could provide reliably accurate measurements in assessing battery health, until now.**

Narrator.

Logos of INL, Montana Tech, Qualtech underscoring research activity in the lab.

Jon Christophersen, on camera

Use title for him:

**“electrical engineering doctoral candidate”**  
**“INL researcher”**

Move to graphic of IMB as applied to electric vehicles.

Narrator.

Close up of IMB and battery during measurement – embedded and through portable application.

## **Idaho National Laboratory**

**researchers and collaborators from Montana Tech and Connecticut-based Qualtech Systems, Inc., have invented the Impedance Measurement Box.**

**“IMB is a major breakthrough – in fact it has never been done before.**

**We are directly measuring the impedance spectrum of a battery in seconds, while it is operating.**

**It is a result of collaborative research among a national laboratory, academia, and industry.**

**We believe this will make a direct contribution in advancing electrical vehicles and to many other areas requiring impedance measurements of energy storage devices.”**

**IMB can be embedded or applied through a portable device to take measurements while the energy**

Narrator.

Video of graphic display showing 10-second test and the system working with various close up shots.

Narrator.

Use graphic 58 from the dissertation and the R&D 100 submission.

Close up of IMB in operation.

Bill Morrison, Qualtech Systems, Inc.

**storage device is in storage, or in operation.**

**It conducts its measurements rapidly – in as little as 10 seconds – with no significant impact to the battery or energy storage device.**

**Sinusoidal signals are generated and strategically separated by a known frequency spread and summed together. This combined signal is injected into the battery and the response is captured by a data acquisition system for analysis.**

**“The results are comparable to laboratory measurements using expensive equipment, but at a fraction of the cost and time.**

**IMB is a proven diagnostic tool that will have application to automotive, electric utilities, telecommunication, aeronautics, consumer electronics and even critical systems for the military and NASA.”**

Narrator.  
Close up of IMB with box open and  
superimposed graphic to its left.

**IMB is an innovative, direct  
measurement of impedance  
combined with a sophisticated,  
proprietary processing algorithm.**

Narrator.  
Lab activity and testing of IMB, using  
laptop displays.

**While IMB was the major  
breakthrough, the research team  
continues to work on a vastly  
improved energy storage monitoring  
system that combines IMB with  
other measurements of voltage,  
current and temperature.**

Narrator.  
Montage of previous video as wrap up text  
beings.

**IMB represents a “never been done  
before breakthrough in electrical  
engineering.” With it as a  
foundation, soon a new monitoring  
system will provide reliable and**

Move to video of military, space, electric  
utilities, and vehicle manufacturing.

**accurate state-of-health  
assessments for many areas –  
military, space, medicine, electric  
utilities, automotive manufacturing,  
and consumer electronics. END**

End with INL Logo